REPRODUCTIVE DISORDERS IN BRAHMAN CROSS IN SOUTH-EASTERN SOUTH SULAWESI PROVINCE*

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ABSTRACT

The objective of this study was to investigate the incidence of reproductive disorders in Brahman cross. The study was conducted in Bantaeng Regency; south-eastern South Sulawesi Province. A total of 94 Brahman cross both heifers and cows from seven herds were examined in the present study. Trans-rectal palpation of the genitalia was performed to assess ovarian structures and uterine conditions. Reproductive disorders diagnosed during a clinical examination, e.g., ovarian cysts, inactive ovary(s) were noted. Out of 94 animals, there was 22% became pregnant after repeated inseminations (3.2±1.3), and the others (78%) were not pregnant due to various problems. Of the 73 cows that did not become pregnant after repeated inseminations, 16.4% were repeat breeders and showed normal cyclicity, while the incidence of repeat breeding in pregnant animals was 45%. The repeat breeders required 4.4±0.5 inseminations to become pregnant. The other animals (83.6%) were suffered from miscellaneous ovarian disorders such as inactive ovary(s), luteal and follicular cysts. In conclusion, high incidence of reproductive disorders was found in Brahman cross both heifers and cows. Inactive ovaries and follicular cysts were the major reproductive disorders, and in turn, reduced reproductive performance in Brahman cross.

Keywords: Brahman cross, reproductive disorders, inactive ovary, cyst.

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INTRODUCTION

Systematic breeding programs provide an organized and efficient approach to administering AI and improving reproductive efficiency (Sellars et al., 2006). Reproductive efficiency in beef cows is dependent on achieving high submission rates and high conception rates per service (Roche et al., 2000). In order to achieve good submission and conception rates, cows must resume ovarian cyclicity, have normal uterine involution, be detected in estrus and inseminated at an optimum time (Crowe, 2008). Basically, the goal of cow-calf operations is to obtain and wean one calf per cow per year. Thus, after a period of pregnancy of approximately 280 d, cows have to establish a pregnancy within 80 – 85 d after calving (Yavas and Walton, 2000[a]) so that calving-to-calving intervals are maintained at 365 days (Crowe, 2008). However, there is a variable anestrous period following calving in the cow (Roche et al., 1992). One of the most prominent ovarian clinical disorders is ovarian afunction (Mwaanga et al., 2003).

Ovarian activity is resumed within 7–20 days of calving in the majority of cows, which involves development of a dominant follicle (DF) (Roche et al., 1992). Failure of ovulation of DF is associated with infrequent LH pulses in the early postpartum period, and both suckling and low level of nutrition are implicated in prolonged suppression of LH pulses in the absence of progesterone resulting in prolonged duration of postpartum anestrus. Postpartum anestrus is a transition period during which the functional hypothalamic-pituitary-ovarian-uterine axis recovers from the previous pregnancy. Duration of postpartum anestrus is affected by four major factors: suckling, nutrition, season, and age (parity) (Yavas and Walton, 2000[a]). Prolonged postpartum anestrus is a main factor limiting reproductive efficiency in cattle particularly in *Bos indicus* and *Bos Taurus/Bos indicus* cows from tropical region, because it prevents achievement of a 12 months calving interval (Montiel and Ahuja, 2005). This reproductive disorder results economic loss to the producers by reducing calf crop. Therefore, in order to achieve high submission and pregnancy rates and to reduce the prolongation of postpartum anestrus interval, it is necessary to recognize the reproductive disorders in animals as early as possible. The objective of this study was to investigate the incidence of reproductive disorders in Brahman cross using trans-rectal palpation.

MATERIAL AND METHODS

Animal and Herd Management

The study was conducted in Bantaeng Regency; south-eastern South Sulawesi Province from seven herds; farmers group (under tropical condition). A total of 94 Brahman cross both in heifers and cows, aged from three to seven years old were used in the present study. Animals in each herd were confined in tie-stall barns with concrete floor. In all herds, no estrus/ovulation synchronization programs were used. Animals were artificially inseminated approximately within 12 h by inseminator after detection of estrus by the owners using frozen/thawed semen of proven sires.

Clinical Examination

Each herd was visited once for reproductive health check that included the diagnosis of reproductive disorders, pregnancy diagnosis, and measurement of body condition score (BCS; scale 1 – 9) (Momont and Pruitt, 1998; Mathis et al., 2002) on March 12-13, 2011. Trans-rectal palpation of the genitalia was conducted to assess ovarian structures and uterine conditions. Animals diagnosed pregnant indicated by development of uterine. Animals were considered cycling if palpable corpus luteum (CL) or dominant follicle (DF) in the ovary without development (enlarge) of uterine. Ovarian cysts was defined as one or more follicle-like structures >25 mm in diameter without a concurrent CL. Ovaries without palpable structures (i.e., ovarian follicles >10 mm and/or a functional CL) were considered inactive (Yusuf et al., 2010[a]).

Definition of Repeat breeder and Reproductive Performance

A repeat breeder was defined as an animal which did not become pregnant after three inseminations, despite no clinically detectable reproductive disorders (Yusuf et al., 2010[a]), otherwise, animals conceived within three inseminations were considered normal fertility (Yusuf et al., 2010[b]). The following reproductive end points were used to characterize reproductive performance:

- Proportion of animals become pregnant
- Service per conception

Statistical analyses

All data showed as percentage, average, and standard deviation (SD) were calculated using Microsoft Excel for Windows. The percentage of animals pregnant, cyclic animals, animals with ovarian cyst, and inactive ovary were calculated by the number of animals pregnant, cyclic animals, animals with ovarian cyst, and inactive ovary, respectively divided by the total number of animals multiply by 100. The percentage of the incidence of repeat breeding for pregnant animals was calculated by the number of repeat breeders for the animals become pregnant divided by the total number of pregnant animals multiply by 100.

RESULTS AND DISCUSSION

Reproductive Disorders in Brahman Cross

Reproductive disorders in Brahman cross both heifers and cows diagnosed in the present study are shown in Table 1.

Table 1. Clinical findings using trans-rectal palpation of the genitalia and body condition score (BCS) in Brahman cross

Item	Heifers	Cows	Total
No. of animals	83	11	94
No. of animals pregnant (%)	20 (24)	1 (9)	21 (22)
No. of cyclic animals (%)	10 (12)	2 (18)	12 (13)
No. of animals with ovarian cyst (%)	10 (12)	3 (27)	13 (14)
Inactive ovary (%)	43 (52)	5 (45)	48 (51)
BCS (range)	3.8 (1 – 6)	3.2 (2 – 4)	3.8 (1 – 6)

Based on clinical examination using trans-rectal palpation, high incidence of reproductive disorders was noted. The incidences of cycling animals, ovarian cysts, and inactive ovaries in both heifers and cows of Brahman cross were 13%, 14%, and 51%, respectively (Table 1). It is noteworthy that Brahman cross was tremendous suffering from inactive ovaries and ovarian cyst especially follicular cyst. Prolongation of acyclicity due to inactive ovaries results in economic loss for the farmers. Yavas and Walton (2000[b]) stated that prolonged postpartum acyclicity in suckled beef cows reduces the calf crop, and causes economic loss to beef cattle producers. Under-nutrition has been suggested to prolonged postpartum anestrus, particularly among animals dependent upon forages to meet their feed requirement and it apparently interacts with genetic, environmental or management factors to influence the duration of anestrus (Montiel and Ahuja, 2005). In the present study, as shown in Table 1, the average of BCS was only 3.8 ranging from 1 to 6, in which reflected as poor nutritional status. This nutritional status results in lower the availability of glucose and increases mobilization of body reserves (Yavas and Walton, 2000[a]). Moreover, under-nutrition decreased LH release or even delayed resumption of LH pulsatility in postpartum beef cows, reduced pituitary gonadotropin content, and prolonged the postpartum acyclicity. Likewise, insulin and insulin-like growth factor-I (IGF-I) have been postulated as key mediators between nutritional status and ovarian function in cattle (Diskin et al., 2003; Kawashima et al., 2007). This suggested that low insulin and IGF-I concentrations in the circulation are associated with a long interval from parturition to first ovulation (Butler, 2000; Braw-Tal et al., 2009), subsequently reduced reproductive efficiency. Several studies have indicated that both insulin and IGF-I are involved in selection of dominant follicle toward ovulation (Fortune et al., 2004; Spicer, 2004). Insulin has been recognized in follicular development and IGF-I is important for development of bovine follicle up to follicular dominance, and both insulin and IGF-I together with increasing estradiol levels stimulates the dominant follicle to reach final maturation, which in turn leads to LH surge and ovulation (Kawashima et al., 2007).

In pregnant cows, severe under-nutrition in the last trimester of pregnancy and postpartum may result in the absence of ovarian follicles ≥5 mm in diameter or of larger (>8 mm) follicles that can produce appreciable amounts of estradiol (Braw-Tal et al., 2009).

The second reproductive disorder diagnosed in this study was ovarian cysts (follicular cysts). This indicated the dysfunction of hypothalamic-pituitary axis (Vanholder et al., 2006). Low insulin and IGF-I as mentioned above was associated to the cyst formation as resultant of under-nutrition. Under-nutrition cause an increase in circulating concentrations of growth hormone (GH), accompanied by decreases in circulating levels of insulin and liver GH receptors. These factors reduce the production of insulin-like growth factors (IGFs) and IGF binding protein in the liver, so the net effect is that plasma concentrations of IGFs fall (Pryce et al., 2004). The mechanism of follicular cyst formation has been well reviewed by Vanholder et al. (2006). An FSH surge stimulates the emergence of a new follicular wave, from which a single dominant follicle is selected at the time of deviation. Through a positive feedback loop estradiol stimulates GnRH and LH pulsatility, which in turn supports growth and development of the dominant follicle. Upon reaching preovulatory size, follicular steroidogenic activity reaches a peak and produces a preovulatory estradiol surge. This surge either fails to elicit a GnRH and subsequent LH surge or GnRH/LH surge is mistimed/delayed. The dominant follicle, therefore, does not ovulate but, due to ongoing LH pulsatility, continues to grow and becomes a cyst.

Reproductive Performance of Brahman cross in Seven Herds

Table 2. shows the reproductive performance of Brahman cross in seven herds both heifers and cows.

Table 2. Reproductive performance in Brahman cross

Item	Total
No. of animals	94
No. of animals pregnant (%)	21 (22)
Service per conception (±SD)	3.2 ± 1.3
The incidence of repeat breeding for pregnant animals (%)	10/21 (45)
Service per conception for repeat breeders (±SD)	4.4 ± 0.5

SD = Standard deviation

Out of 94 animals in seven herds, 11 (11.7%) animals had calved with the interval from calving to clinical examination was approximately 10 months. Only one of these cows became pregnant after repeated inseminations with the interval from calving to conception was greater than 10 months. The proportion of animals that conceived during clinical examination was 22% both heifers and cows (Table 1).

Beside high incidence of reproductive disorders especially postpartum acyclicity and follicular cysts that was reduced reproductive efficiency in the present study, the incidence of repeat breeding both in the groups of pregnant and non-pregnant animals was also found to be high. The incidence of repeat breeding for non-pregnant animals was 16.4%. While the incidence of repeat breeding for pregnant animals was much greater (45%) (Table 2). The other 55% was normal fertility. This suggested that more inseminations needed for the animal to become pregnant.

Repeat breeding has long been considered one of the important reproductive disorders and causes economic loss to the producers. Causes of the repeat breeding are multifactorial (Yusuf et al., 2010[a]). Undoubtedly, repeat breeder cows are subject to the same problems of fertilization failure and embryonic mortality (Silvia, 1994). A more detailed classification of repeat breeding based on pathological and managerial causes: 1) congenital or genetic anatomical defects of genital tracts, 2) congenital, genetic or acquired defects of the ova, spermatozoa or early zygote, 3) infectious or traumatic inflammatory processes, 4) endocrine dysfunction, and 5) managerial and nutritional deficiencies (Roberts, 1986).

In conclusion, reproductive disorders in Brahman cross under tie-stall condition were very high. The major reproductive disorders in Brahman cross were inactive ovaries and follicular cyst, and in turn, reduced reproductive performance.

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